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Abstract

The focus of this project is to demonstrate the effectiveness of Amended Silicates™ sorbents as a mercury control technology for coal-fired power plants. The demonstration will be conducted at Cinergy's Miami Fort Unit 6 over a period of about eight weeks under typical plant operating conditions. Several trial campaigns will be completed: a parametric series of injection rates for the Amended Silicates sorbent to characterize its performance at the host site, an extended period (30 days) over which Amended Silicates sorbent is injected to evaluate long-term performance of the technology in an operating power plant, and an abbreviated series of injection rates with powdered activated carbon to serve as a basis of comparison. Samples of the host unit fly ash mixed with Amended Silicates sorbent will be extracted for testing as a cement replacement. A unique feature of the Amended Silicates sorbent is that its addition to a flue gas stream does not affect the salability of the collected fly ash plus sorbent as a pozzolan additive.

In this quarter of the project, activities focused on the launch of a cooperative effort with Engelhard Corporation to establish a protocol for manufacture of the 50 tons of Amended Silicates sorbent for use in the demonstration and on meeting with the DOE to present an update to the project status. In the discussions with Engelhard the project team identified milestones and finalized a schedule to produce the sorbent material for the planned injection tests.

Preparation of the demonstration plan continued this quarter. The status meeting with DOE resulted in modification of the order in which the sorbent trials will be completed. These changes are now being incorporated into the document, which will be published next quarter.

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Executive Summary

The Amended Silicates™ sorbent technology is a mercury control material that is a direct replacement for activated carbon. Amended Silicates sorbent is a powdered material similar to carbon injected upstream of existing particulate control equipment for rapid and effective capture of vapor-phase mercury in the flue gas stream. This technology has been under development for the past two years with funding from the EPA and DOE, and has achieved success in demonstrating the sorbent at a pilot scale on a slipstream from a Colorado power plant. This demonstration of Amended Silicates™ sorbents will evaluate the use of injected particulate sorbents to control of mercury emissions from Cinergy's Miami Fort Unit 6 for a period of six weeks under various conditions. A consortium has been established to support the technical and financial requirements imposed by a long-term test of this technology. The consortium includes utilities with an interest in cost-effective mercury control technologies, mercury control technology suppliers (i.e., Amended Silicates, LLC and its parent companies); the University of North Dakota Energy and Environmental Research Center to lead the mercury measurement effort; a modeler to provide insight into the fluid mechanics of sorbent injection; with strong interest on the part of EPRI and the American Public Power Association.

The project has been defined in three stages: **preparation**, which incorporates all activities to prepare the host site for the demonstration, as well as the manufacturing of 50-100 tons of Amended Silicate™ sorbent; **demonstration**, where a matrix of sorbent injection cases will be conducted; and **analysis**, during which all the collected data will be correlated, analyzed, and interpreted to provide quantitative information regarding the performance of the Amended Silicate™ sorbent at a commercial scale. ADA has established a series of milestones for these three stages as delineated in this report.

In this quarter, ASL worked closely with our new strategic manufacturing partner, Engelhard Corporation, to conduct engineering activities needed to complete a protocol for manufacture of 50 tons of Amended Silicates sorbent. This work is being done under the recently executed Joint Development Agreement (JDA) between ASL and Engelhard. Additional computational fluid dynamic models were completed to evaluate the use of existing ports in the Unit 6 ductwork as an alternate location for sorbent injection. In April 2005, a status meeting was held at DOE's facility in Pittsburgh, PA. Comments from DOE technical personnel at this meeting helped to refine the scope of the demonstration phase of the project as well as providing an opportunity for new ASL team members to meet the technical DOE staff monitoring the project. Preparation of a Demonstration Plan to guide field activities at the host site continued, with plans to publish the plan in the next quarter.

Introduction

Amended Silicates, LLC, has been awarded a project to demonstrate its Amended Silicates™ mercury removal sorbent technology in a full-scale trial at a coal fired power plant. The trial is to be hosted by Cinergy at a site in Ohio and funded in part by US Department of Energy's National Energy Technology Laboratory (NETL).

The Amended Silicate™ sorbent technology, a direct replacement for activated carbon, is a powdered sorbent injected upstream of existing particulate control equipment for rapid and effective capture of vapor-phase mercury in the flue gas stream. This technology has been under development for the past two years with funding from the EPA and DOE, and has achieved success in demonstrating the sorbent at a pilot scale on a slipstream from a Colorado power plant.

The Amended Silicate™ sorbents use silicate materials as substrate particles on which a chemical reagent with a strong affinity for mercury and mercury compounds is impregnated. Because of their physical construction, these silicates present extended surface area on each particle combined with an easily-generated particle size of a few microns. This configuration promotes maximum exposure of the chemical amendment to the mercury vapor present in the coal-fired flue gas stream. The base silicate materials typically sell for *4-8¢ per pound*, so they represent a very cost-effective sorbent material. In addition, because of their silicate content, they have been shown to allow the continued sale of fly ash as a pozzolan material. Tests completed by Boral Materials Technologies have indicated that there is no effect on fly ash use in concrete due to the addition of Amended Silicate™ sorbents, in dramatic contrast to the effect of powdered activated carbon injection.

To support EPA's announced intent to regulate the emissions of mercury from coal-fired power plants; NETL solicited proposals and recently has selected eight of those proposals for cost-shared projects to demonstrate mercury control concepts at a commercial scale. The objective of the program is to gather data to document the performance of mercury control technology alternatives when installed and operated at full-scale (100-MW) generating units. One of the selected proposals is for the demonstration of Amended Silicates™ sorbent technology.

This demonstration of Amended Silicate™ sorbents will evaluate the control of mercury emissions from Cinergy's Miami Fort Unit 6 under various conditions. A consortium is being established to support the technical and financial requirements imposed by a long-term test of this technology. The consortium will include utilities with an interest in cost-effective mercury control technologies, especially those that permit continued sale of fly ash as a pozzolan material; mercury control technology suppliers (i.e., Amended Silicates, LLC and its parent companies); an organization to lead the mercury measurement effort; a modeler to provide insight into the fluid mechanics of sorbent injection; and other interested parties. There is strong interest on the part of EPRI and the American Public Power Association in participating in the planned demonstration project.

Amended Silicates, LLC, is a joint venture company formed by ADA Technologies and CH2M HILL that is focused on the manufacture and sale of Amended Silicate™ sorbent. Recently, Amended Silicates, LLC has entered into negotiations with a major materials science company to manufacture the large quantities of Amended Silicate sorbent needed for the demonstration. The Amended Silicates team will lead the technical effort of the proposed project. Cinergy has offered its Miami Fort Unit 6 as a host site, and will provide on-site technical support during injection of the sorbent material. The mercury semi-continuous emissions monitors (SCEMS) will be provided by the University of North Dakota's Energy and Environmental Research Center (UNDEERC), and the Ontario-Hydro wet chemistry testing will be conducted by the Western Kentucky University (WKU). Boral Materials Technologies will perform tests of the collected sorbent plus fly ash to assess the impact of the added sorbent on the use of fly ash as a concrete additive. The ability to continue to sell fly ash is believed to be one of the significant advantages of Amended Silicate™ sorbents in comparison to activated carbon.

Project Description

This trial demonstration project is intended to show the effectiveness of Amended Silicate™ sorbent as a mercury control technology, including the ability to maintain fly ash sales from plants implementing its use. The project will incorporate three sorbent injection campaigns: one where powdered activated carbon is injected for a base-comparison case, a second where Amended Silicates sorbent is injected to establish process parameters required to meet mercury control targets, and a third where Amended Silicate sorbent is injected for a contiguous period of 30 days to validate long-term consistent performance and to discover any impact on balance of plant operation.

There are two major objectives for the full-scale demonstration project. The first is to produce uniform and high-quality Amended Silicate™ sorbent in multi-ton quantities for use in the proposed testing. The second is to demonstrate the ability of Amended Silicate™ sorbent to control emissions of mercury from commercial coal-fired power plants over a typical range of operating conditions for an extended period of time. The data analyses will be extensive, and will include computation of mercury removal rates and the efficiency of Amended Silicate™ sorbents in these applications.

The project has been defined in three stages: **preparation**, which incorporates all activities to prepare the host site for the demonstration, as well as the manufacture of 50-100 tons of Amended Silicate™ sorbent; **demonstration**, where a matrix of sorbent injection cases will be conducted; and **analysis**, during which all the collected data will be correlated, analyzed, and interpreted to provide quantitative information regarding the performance of the Amended Silicate™ sorbent at a commercial scale.

There are specific activities to be carried out in each stage of the project, as described below.

Preparation

- Project planning, including placement of subcontracts with team members and negotiation of a host site agreement with Cinergy.
- Development of a project schedule that reflects availability of the site, subcontractors, and time needed to prepare a commercial quantity of Amended Silicate sorbent.
- Site preparation, including the selection of locations for flue gas sampling ports and sorbent injection ports, and for the installation of a sorbent injection system to supply sorbent to the injection lances.
- Completion of a computational fluid dynamics modeling study to evaluate options for the number and locations of sorbent injection lances.
- Acquisition of a leased sorbent injection skid, fabrication of injection lances, and installation of the full sorbent injection system.
- Transport and installation of the semi-continuous mercury emissions monitors upstream of sorbent injection and at the outlet to the Unit 6 electrostatic precipitator.
- Preparation of 50 tons of Amended Silicate sorbent for use in the trial. This activity includes selection of a toll processor (contract vendor) to manufacture the sorbent, and oversight by Amended Silicates, LLC to assure quality control and consistency of the final product.

Demonstration

In the demonstration phase a series of campaigns will be completed with different sorbents to characterize their performance in capture of mercury from the flue gas of Miami Fort Unit 6. Mercury CEMs will be operated throughout the demonstration phase to collect data on mercury concentrations upstream of sorbent injection and at the outlet of the ESP of the host unit. At three discrete times in the demonstration, Ontario-Hydro wet chemistry sampling will be performed as a check against the mercury CEMs data. The specific mercury removal measurement campaigns are described below.

- Baseline mercury removal characterization for the host unit over a two week period.
- Injection of Amended Silicate sorbent in a parametric series of trials, to characterize performance in the host unit under a range of operating conditions. Target mercury removal rates will be 55% and 80% for this nominal two-week trial.
- Return to normal operations (no sorbent injection) for a period of one week to re-establish a baseline before initiation of a longer-term trial of Amended Silicates sorbent.

- Extended trial of Amended Silicate sorbent for a period of 30 days to evaluate performance and impact on balance of plant equipment.
- Injection of powdered activated carbon as a mercury sorbent on Miami Fort Unit 6. This campaign will run for one to one week, with target mercury removal rates of 55% and 80%.
- During each campaign, samples of fly ash mixed with mercury sorbent material will be extracted for use in tests to determine the effect of the sorbent on the use of the mixture as a pozzolan replacement in the manufacture of concrete.

Analysis

The use of CEMS results in the acquisition of a substantial quantity of data over the demonstration phase of the project. This information will be subject to a rigorous QA/QC review protocol, then archived to a project website where it will be accessible to project team members. This website will provide the home for a project database to be used to correlate mercury removal results with operating conditions of the host unit and performance of the particulate control equipment. The intent is to exploit the website to facilitate access to the data on a timely basis throughout the project. Specific activities to be carried out in the Analysis phase are noted below.

- Prepare and execute a QA/QC plan for the project.
- Establish a project website as a mechanism to share information and coordinate analysis of posted results.
- Create a project data base as a location to which all pertinent information on trials can be transferred for secure storage and analysis.
- Perform routine QA/QC screening of data and add qualified data to the project data base.
- Review and analyze trial data in the project data base to establish performance measures and trends in the data set.
- Analyze samples of fly ash plus sorbent to document the effect of sorbent addition on the use of fly ash as a cement replacement in concrete.
- Supply samples of fly ash to DOE contractor for leachate and mercury stability testing.
- Preparation of reports as required by the Cooperative Agreement.
- Preparation of technical papers that document the results of the trial demonstration.
- Overall management of the project with respect to scope, schedule, and budget.

Project activities are being carried out by technical personnel from the two parent companies of Amended Silicates, LLC. Jim Butz of ADA Technologies serves as Principal Investigator for the project with strong technical support from CH2M HILL and the other members of the consortium. Tom Broderick of ADA will serve as the lead engineer for the project team at the host site during the trial. Joe Hammond of CH2M HILL will direct the site engineering activity for the installation of the sorbent injection system and mercury CEMs.

Project Milestones

Amended Silicates, LLC recently completed negotiations to add a strategic partner to the project team to manufacture the Amended Silicate sorbent material for the demonstration. Engelhard Corporation is a Fortune 500 company that manufactures and sells catalysts, pigments, and sorbents, many using natural mineral substrates into markets worldwide. Engelhard has signed a joint development agreement (JDA), and will negotiate a license to manufacture and sell Amended Silicates™ sorbent for the removal of mercury from combustion flue gas streams. As a result of this agreement has proposed to DOE changes in milestones dates as shown below. The first activity to be carried out under the JDA is an intense review of the sorbent preparation protocol with a focus on unit processes where Engelhard manufacturing experts believe small changes can improve quality and reduce cost. This short-term effort is already under way, and is planned for completion by 31 August, 2005.

The milestones below were recently proposed and approved by DOE as well as modification to the previous schedule.

- **April, 2004:** Cooperative agreement signed by Amended Silicates, LLC and project initiated.
- **August, 2004:** Subcontracts in place, project team coordinates schedule.
- **March, 2005:** Joint Development agreement negotiated with Engelhard Corporation to become strategic manufacturing partner to Amended Silicates, LLC.
- **April 2005:** Engelhard begins preparation of sorbent samples to evaluate process step impact on final sorbent product. Short-term cooperative effort between ADA and Engelhard technical staffs initiated.
- **July 2005:** Production process modifications identified for preparation of 50 tons of Amended Silicates sorbent to be used in Cinergy demo.
- **August 2005:** Scale-up production trial to manufacture nominal 2,000-lb quantity.
- **October 2005:** Begin full-scale production of Amended Silicates sorbent.
- **December 2005:** Deliver Amended Silicates sorbent to Miami Fort Station.
- **First Quarter, 2006:** Begin injection trial.

- **Second Quarter 2006:** Submit samples of fly ash plus sorbent for analysis of suitability for use in concrete.
- **Second Quarter 2006:** Samples provided for leachate and stability testing.
- **July 2006:** Data analyses completed.
- **Second half of 2006:** Presentation of results at technical conferences.

Project Management Activities This Quarter

This report documents project activities that occurred between April 1 and June 30, 2005. For this period, work consisted of tasks in the Preparation phase and Analysis phase. Activities focused on meetings with technical personnel from the host site for the project (Cinergy's Miami Fort Unit 6) and with the technical people with our new strategic partner who will manufacture the Amended Silicate sorbent material for the demonstration.

Members of the project team met with DOE representatives in Pittsburgh, PA in April to present project status and to introduce Engelhard Corporation as our new strategic manufacturing partner. Topics of interest covered in the meeting included a technical presentation outlining the injection demonstration program and a revised schedule for sorbent manufacturing and subsequent sorbent injection campaigns at the host site. One topic of discussion was the timing and duration of the carbon injection trial. It was agreed that one week of carbon injection testing was adequate as a basis for comparison with the Amended Silicates sorbent. It was also pointed out that other full-scale demonstrations of powdered activated carbon had resulted in residual effects on the fly ash for periods of up to several months. With this in mind, the order of sorbent injection campaigns was revised to conduct the Amended Silicate sorbent injection demonstration first, followed by the carbon injection trial. In light of these demonstration phase schedule changes, ADA and CH2M HILL reviewed their respective budgets and confirmed that the demonstration project can be completed within the existing budget allocations from DOE and cost-share partners.

In early May representatives from Engelhard Corporation, CH2M HILL and ADA Technologies, Inc. met in Denver to develop a plan and schedule for modification to the sorbent manufacturing protocol that promise to improve quality and reduce the overall cost of Amended Silicate sorbents. Engelhard and ASL have worked closely over the past few months in response to the execution of a Joint Development Agreement to finalize a sorbent preparation protocol for the production of 50 tons of Amended Silicates sorbent. An extensive series of production process samples prepared by Engelhard has been evaluated in ADA's in-flight test apparatus on a quick turn-around basis to facilitate homing in on an optimum sorbent production protocol. Feedback from ADA on sample testing results has guided Engelhard's development efforts in understanding how changes to the manufacturing process impact sorbent performance.

Engelhard's expertise in material science and manufacturing processes for catalytic materials are playing an important role in the production of Amended Silicate sorbent to be used on this project. Engineers and operators at two of their manufacturing facilities are presently contributing to the project team in streamlining the manufacturing process. An innovative approach to sorbent production has been adopted by Engelhard that reduces secondary waste

streams. Handling of these waste streams contributed to the overall sorbent cost and with the revised sorbent process, Amended Silicate sorbent materials will become even more cost-effective for mercury removal while maintaining fly ash salability.

Work also continued this quarter on the preparation of a Demonstration Plan for the sorbent injection trials at Miami Fort Unit 6. The demonstration plan from an earlier DOE mercury control project was used as a template. The order and duration of sorbent injection campaigns was modified in the demonstration plan to reflect discussions at the DOE status meeting. The plans now specifies two-weeks of baseline mercury measurements (with no sorbent injection), two-weeks of parametric evaluation with injection of Amended Silicates sorbent at varying rates, a return to baseline operation (no sorbent injection) for one to two weeks, followed by 30 days of continuous injection of Amended Silicates sorbent as the core long-term trial at this host site. Following the Amended Silicates sorbent campaigns, activated carbon will be injected into Unit 6 for one week. Plant operators have discovered an existing set of ports that appear well-suited for sorbent injection. The demonstration plan was updated to include description and locations of these new ports.

Experimental

During a February site visit an array of four ports was discovered just downstream of the air heater outlet on Unit 6, judged to be interesting candidates for use as sorbent injection locations. ASL conducted additional computational fluid dynamics (CFD) modeling cases to evaluate use of these ports on sorbent distribution in the duct cross-section. The model was configured with four lances spaced on 10-foot centers across the split duct just downstream of the outlets from the twin air pre-heaters of Unit 6. Sorbent dispersion in the flue gas as a function of distance downstream of the injection ports was predicted in model runs, with results summarized below.

During the site visit to Miami Fort in February, questions were raised by Cinergy concerning the impact injected sorbents may have on suspended solids in the host unit ash ponds. Water samples from the flyash sluice on Unit 6 were collected by Cinergy personnel and sent to ADA Technologies, Inc. for Settleable Solids and Total Suspended Solids determinations. Protocols used for the analyses were taken from “Standard Methods for the Examination of Water and Wastewater,” using 2540F for Settleable Solids analysis and 2540D for Total Suspended Solids.

Results and Discussion

CFD Modeling Effort

The CFD modeling conducted this quarter investigated sorbent dispersion in flue gas using four existing ports located downstream of the twin Unit 6 pre-heaters; at this location, the outlet duct is actually split into two sections, which are joined just downstream. Figure 1 presents a 3-D rendering of the configuration of Unit 6 ductwork used in the model; the two parallel duct sections exiting the air pre-heaters are seen adjacent to the right-most “A” identifying the cross-section line in the rendering. Sorbent dispersion was calculated downstream the sorbent injection

ports by the CFD model; plots are shown in succeeding figures for multiple locations as identified in Figure 1: section A-A (10 feet), section B-B (40 feet) and section C-C (after second set of turning vanes). The flow in Unit 6 is upward to ESPs located on the building roof. Sorbent distributions in the duct cross-section from the model corresponding to the noted locations are shown in Figure 2, 3, and 4, respectively. The CFD modeling showed that there is a high degree of mixing 40 feet above the sorbent injection point, as reflected in the relatively uniform coloring in the cross-section plots. The results presented here compare favorably with previous model projections for an eight-lance array situated at a location about 40 feet downstream of the current location. Based on these results it is recommended that these existing ports be used for installation of lances for sorbent injection.

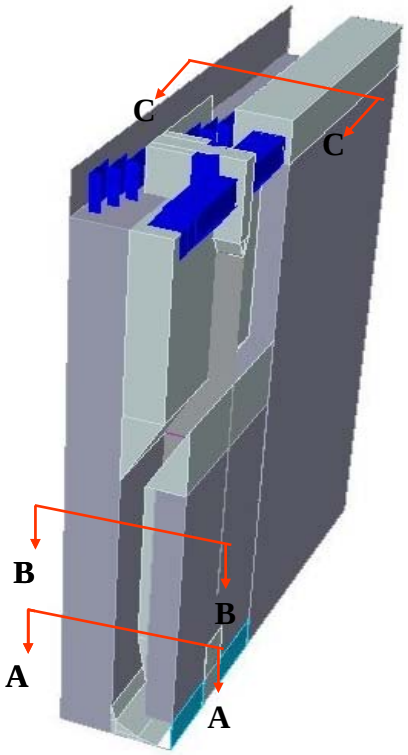

Figure 1 – Schematic of Unit 6 Duct Work

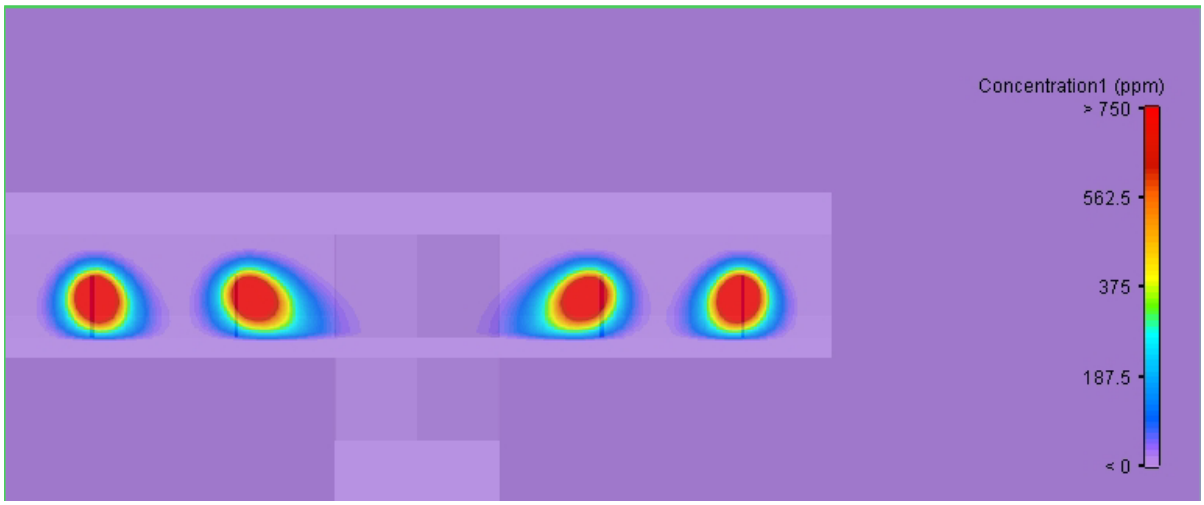

Figure 2 – Section A-A Concentration 10 ft above Lance Installation

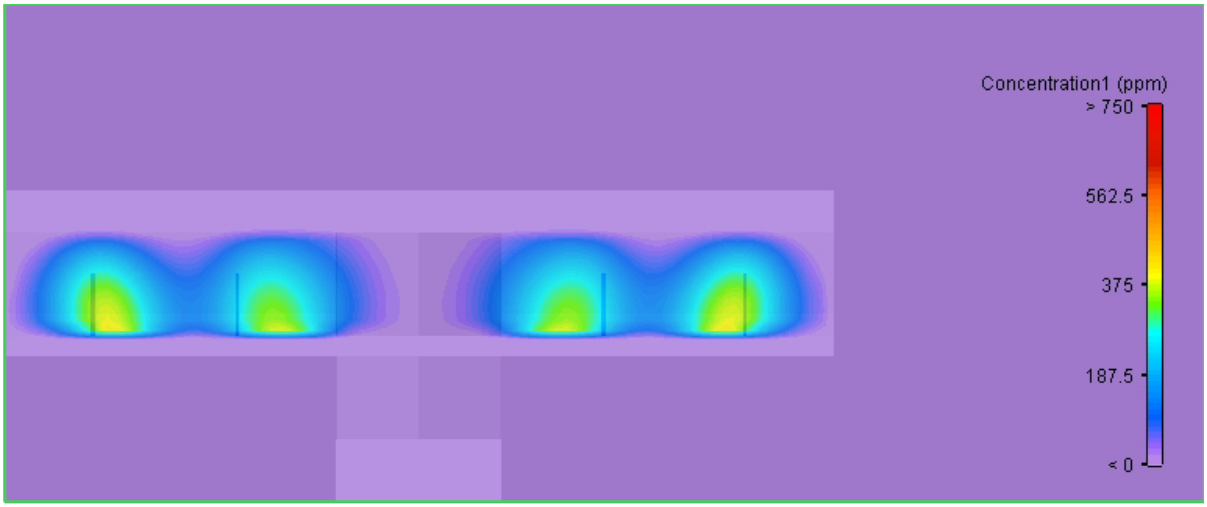

Figure 3 – Section B-B Concentration 40 ft above Lance Installation

Figure 4 – Section C-C Concentration after Second Turning Vane Set

Settleable Solids and Total Suspended Solids Analyses

Samples of the flyash sluice water from Unit 6 were collected by Cinergy and sent to ADA in four 1-liter bottles. The samples were quite variable in the amount and size of solids in the liquid. To obtain a homogeneous sample for analysis, the contents of the bottles were combined in a large laboratory container. The combined sample was then passed through a series of sieve trays ranging in size from 3/8" to 35 mesh (nominal 500 micrometer) to generate a size distribution for the suspended solids. The weight of solids collected on each tray was measured and reported as oversized solids, with results shown in Table 1. The liquids and solids passing through the 35 mesh screen were collected in a large vessel and evenly divided into four 1-liter samples for subsequent tests.

One of the 1-liter bottles was used to determine baseline amounts of Settleable Solids (SS) and Total Suspended Solids (TSS) in the flyash sluice water. For this test the sample was poured into an Imhoff cone, agitated and allowed to settle for one hour. The volume of SS was determined by reading the marking on the side of the cone. TSS in the liquid were then determined by siphoning off 250 ml of the liquid from the cone and filtered through a glass-fiber filter. The filter and residue retained on the filter were dried to constant weight at 103 to 105ºC.

With the other three 1-liter samples, different sorbent materials were added to the sluice water samples to determine if the addition of activated carbon or Amended Silicate sorbents would affect the amount of suspended solids in the samples. To each of the 1-liter bottles 0.15 grams of the appropriate sorbent material was added. This amount of sorbent is equivalent to a 5% weight loading of sorbent in the flyash material. SS and TSS results are shown in Table 2.

Table 1 – Summary of Oversized Solids from Unit 6 Flyash Sluice Water

Mesh Size	Grams	wt %
>3/8"	59.4	13.2%
<3/8" +1/4"	77.8	17.3%
<1/4" +4	88.5	19.7%
<4 +6	84.4	18.8%
<6 +10	66.7	14.8%
<10 +12	14.6	3.2%
<12 +14	13.4	3.0%
<14 +20	22.2	4.9%
<20 +25	3.8	0.8%
<25 +30	3.9	0.9%
<30 +35	3.1	0.7%
<35	12.3	2.7%
Total	450.1	100%

Table 2 – Analyses of Settleable and Suspended Solids in Flyash Sluice Water

Sample Description	Settleable Solids ml/liter	Total Suspended Solids mg/liter
Baseline (No additive)	4.8	76
0.15 g carbon added	4.8	97
0.15 g Amended Silicate A added	6.7	100
0.15 g Amended Silicate B added	5.4	128

Bottom ash and flyash from all power generating units at Miami Fort Station are discharged to the same flyash pond with Unit 6 contributing between 25% and 30% of the total flow to the pond. Historical TSS measurements for the discharge from the flyash pond are in the single digit mg/liter (ppm) levels. The Station's National Pollution Discharge Elimination System (NPDES) limit on TSS for pond water discharged to the Ohio River is 30 ppm. Considering an incoming TSS of 76 ppm for the flyash sluice water and a 30% contribution to the overall flow to the pond this indicates that significant settling occurs in the pond. Water samples spiked with activated carbon and Amended Silicate sorbent A had about 30% more TSS over baseline measurements. Even with a 30% percent increase in TSS caused by the presence of a sorbent material, it does not seem likely that the TSS in the pond water discharge will exceed the NPDES permit limit.

Conclusions

Analysis of CFD modeling results indicate that the existing ports downstream of the air pre-heater on Unit 6 are suitable for sorbent injection, a conclusion which will be reviewed with Cinergy personnel in anticipation of a final decision on sorbent injection port locations in the

next quarter. Model results showed that there is reasonable dispersion of sorbent at a distance 40 feet downstream of the injection ports. It is recommended that these ports be used for sorbent injection for the demonstration program.

The baseline amount of TSS in Unit 6 flyash sluice water was found to be 76 mg solids per liter of liquid. Water samples spiked with activated carbon and Amended Silicate sorbent A each had TSS values 30% greater than baseline measurements. Given the historical TSS levels in the flyash pond water discharge, it does not seem likely that even a 30% increase in TSS will violate the Station's NPDES permit limit.

References

Standard Methods for the Examination of Water and Wastewater, Published jointly by: American Public Health Association, American Water Works Association, and Water Environment Federation, Publication Office: American Public Health Association, 1015 Fifteenth Street, NW, Washington DC 20005-2605, 20th Edition, 1998.

Bibliography

None.

List of Acronyms and Abbreviations

ADA	ADA Technologies, Inc.
ASL	Amended Silicates, LLC
CEM	Continuous Emissions Monitor
CFD	Computational Fluid Dynamics
CH2	CH2M HILL
DOE	Department of Energy
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
ESP	Electric Static Precipitator
JDA	Joint Development Agreement
LLC	Limited Liability Company
NETL	National Energy Technology Laboratory
NPDES	National Pollution Discharge Elimination System
QA/QC	Quality Assurance/Quality Control
SCEM	Semi- Continuous Emissions Monitor
SS	Settleable Solids
TSS	Total Suspended Solids
UNDEERC	University of North Dakota's Energy and Environmental Research Center
US	United States
WKU	Western Kentucky University

Planned Activities for Next Quarter

The next quarter of the project will see continued efforts in the planning and analysis phases, including the following elements:

- A focused cooperative effort to finalize the large-scale manufacturing protocol with new strategic partner Engelhard Corporation. The intent here is to have a protocol ready for evaluation in a pilot run of a few hundred pounds of Amended Silicates sorbent in August of 2005, to be followed by a larger pilot run of around one thousand pounds by October of 2005. Production of the 50 tons of Amended Silicates sorbent required for the Cinergy demonstration is scheduled for completion by mid-December of 2005. All pilot materials will be subjected to extensive testing to characterize performance as a mercury sorbent and properties required for effective use in the demonstration project.
- Complete negotiations and sign a host site agreement with Cinergy Services. ADA will lead this effort.
- Complete preparation of the demonstration plan and associated sampling protocols. ADA Technologies to lead this effort.
- Prepare reports to meet requirements of the cooperative agreement. ADA Technologies to complete these reports.
- Prepare and deliver a presentation at the DOE Mercury Program Review meeting in Pittsburgh, PA, scheduled to be held July 12th through the 14th.